COMPUTER VISION-ASSIGNMENT 2

Group members:
1)R Shivasai charan(S20170010130)
2)Y Sivakrishna(S20170010185)
3)Y Narendra Reddy(S20170010186)

Question-1:- Image Stitching :

Given images:

Stitching a pair of images:

1. Consider a pair of images which are to be stitched together.
2. Compute the sift-keypoints and descriptors for both the images using cv2.xfeatures2d.SIFT_create().detectAndCompute().

3. The distances between every descriptor in one image and every descriptor in the other image are computed.
4. All pairs whose descriptor distances are below a specified threshold, or the top few hundred descriptor pairs with the smallest pairwise distances are selected as matched key points.
5. Feature matching is done based on the feature distances computed previous by taking the ratio of the best and second best match.

Image showing the keypoint matching in both images

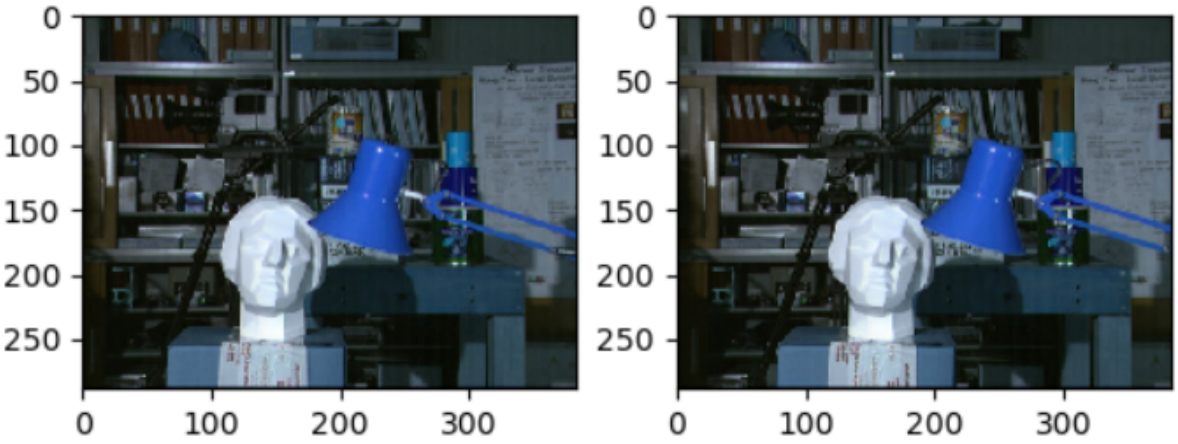
6. Homography matrix is needed to perform the transformation, and the homography matrix requires at least 4 matches. Run RANSAC to estimate a homography mapping one image onto the other.
7. Use four matches to initialize the homography in each iteration. The output should be a single transformation, H , that gets the most inliers in the course of all the iterations.
8. Warp one image onto the other using the estimated transformation

Image after warping one image onto other using the estimated transformation

Question-2:- Stereo Matching:

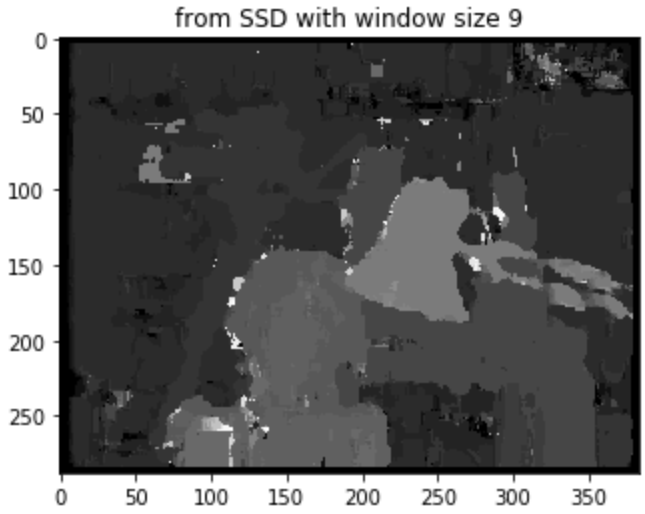
1) Pick a window around each pixel in first(reference) image .
2) Initialize the disparity range.
3) Search the corresponding scanline in second image for a matching window
4) Matching window is picked by doing SSD or cross correlation between the two windows and choosing the best according to the choices of matching function.
5) For every pixel,depth is calculated using depth[i,j]=best_offset(disparity value)*(255/disparity range)

Input images



Output:

```
CPU times: user 24.3 s, sys: 6.99 ms, total: 24.3 s
Wall time: 24.4 s
CPU times: user 4min 17s, sys: 23 ms, total: 4min 17s
Wall time: 4min 17s
```




```
CPU times: user 4min 16s, sys: 31 ms, total: 4min 16s
Wall time: 4min 16s
```